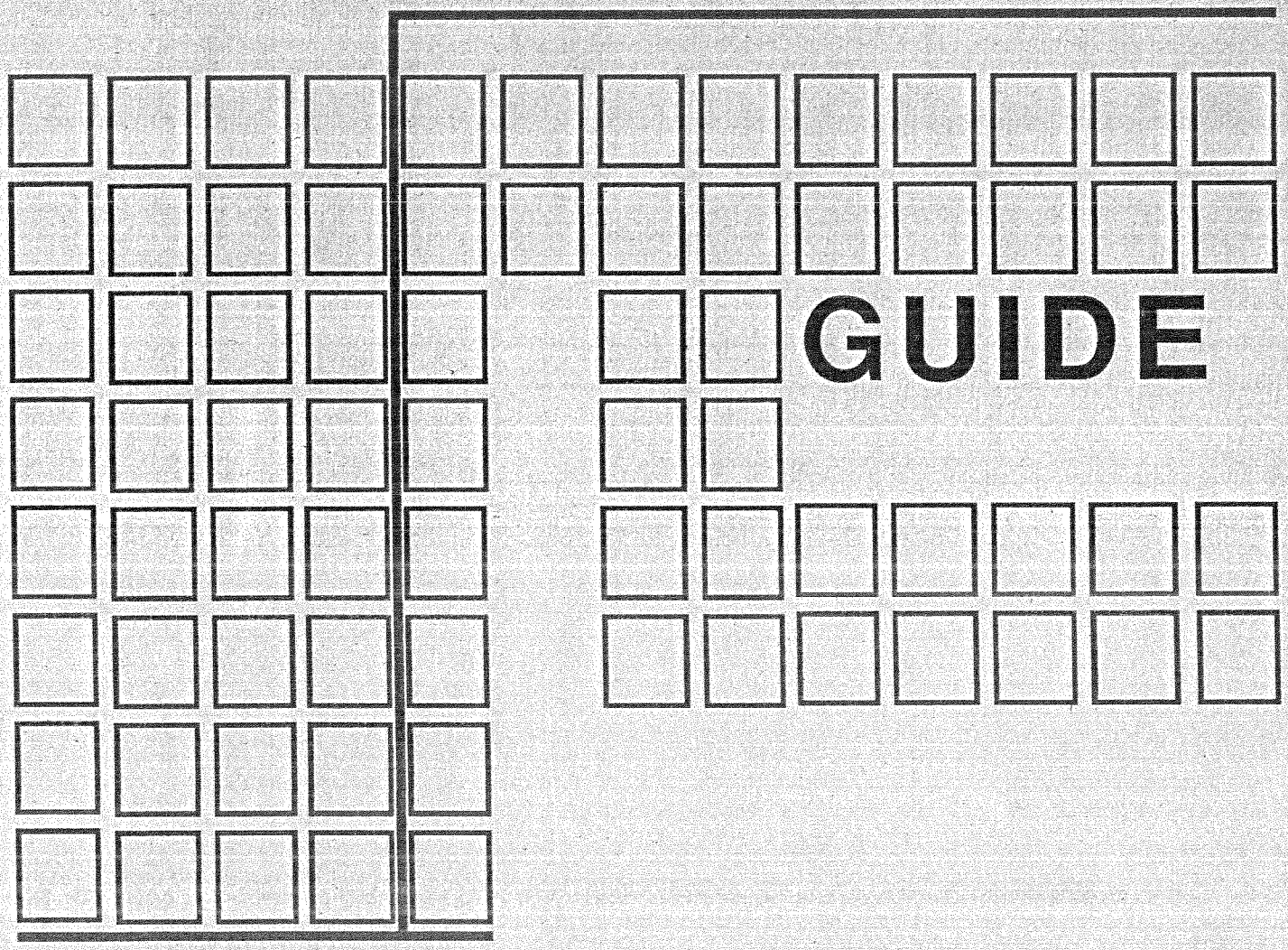
COAL MINE MAP



GUIDE

MINING EXTENSION SERVICE

College of Mineral and Energy Resources
West Virginia University

Study Guide Series No. 8

COAL MINE MAP GUIDE

A Study Guide

by

Mining Extension Service
College of Mineral and Energy Resources
West Virginia University
Morgantown
July, 1975

Revised, 1987

Preface

The Mining Extension Service of West Virginia University has identified a pressing need for quality instructional material for coal miner training. This study guide is the result of an ongoing effort by Mining Extension to meet that need. It is clear-cut, easy-to-read study guide that will be of value to trainers and trainees on all levels of coal miner training. We welcome and encourage critical comments about this study guide as such comments will help us to produce better, more effective instructional material in the future.

The material presented in this study guide rightfully belongs to the people of West Virginia. Anyone wishing to use all or part of the material may do so without special permission. We ask only that due credit be given to the Mining Extension Service of West Virginia University.

Note: This revised "Mine Map Study Guide" (8) is to be used in conjunction with "Mine Ventilation Practice Maps" (8 - A). Additionally, two slide-tape programs, "Introduction to Mine Maps" (215) and "Mine Ventilation Controls" (204), have been developed for use with this study guide. To order, write: WVU Bookstore, College Avenue, Morgantown, WV. 26506.

Acknowledgements

This revised edition of the "Mine Map Study Guide" has been prepared by Marilyn Noah and Terry Pervola of the Mining Extension Service.

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PART 1

The Mine Map

The Mine Map

DEFINITION: A mine map is a horizontal projection (drawing on paper in this case) of the mine workings, drawn to a definite scale, showing all of the important features of the mine.

The mapping of all coal mines is to be supervised by a competent engineer or a land surveyor, and the work of this engineer or surveyor must be supervised by a certified civil engineer or mining engineer.

The operator of every coal mine must make, or have made, an accurate map of the mine on a scale of not less than 100 and not more than 500 feet to the inch. According to the West Virginia Mining Law, 22A-2-1, the mine map will show the following:

(1) Name and address of the mine:
(2) The scale and orientation of the map;
(3) The property or boundary lines of the mine;
(4) The shafts, slopes, drifts, tunnels, entries, room, crosscuts and all other excavations and auger and strip mined areas of the coalbed being mined;
(5) All drill holes that penetrate the coalbed being mined;
(6) Dip of the coalbed;
(7) The outcrop of the coalbed within the bounds of the property;
(8) The elevations of tops and bottoms of shafts and slopes;
(9) The elevation of the floor at intervals of not more than two hundred feet in:
    (a) At least one entry of each working section, and main and cross entries;
    (b) The last line of open crosscuts of each working section, and main and cross entries before such sections and main and cross entries are abandoned; and
(10) Contour lines passing through whole number elevations of the coalbed being mined;
(11) As far as practicable the outline of existing and extracted pillars;
(12) Entries and air courses with the direction of airflow indicated by arrows;
(13) The location of all surface mine ventilation fans, which location may be designated on the mine map by symbols;
(14) Escapeways;
(15) The known underground workings in the same coalbed on the adjoining properties within one thousand feet of such mine workings and projections;
(16) The location of any body of water dammed in the mine or held back in any portion of the mine;
(17) The elevation of any body of water dammed in the mine or held back in any portion of the mine;
(18) The abandoned portion or portions of the mine;

(19) The location and description of at least two permanent base line points and at least two permanent elevation bench marks;

(20) Mines above or below;

(21) Water pools above;

(22) The location of the principal streams and bodies of water on the surface;

(23) Either producing or abandoned oil and gas wells located within five hundred feet of such mine and any underground area of such mine;

(24) The location of all high pressure pipelines, high voltage power lines and principal roads;

(25) The location of railroad tracks and public highways leading to the mine, and mine buildings of a permanent nature with identifying names shown;

(26) Where the overburden is less than one hundred feet, occupied dwellings;

(27) Such other information as may be required under the federal act or by the Department of Energy.

The map must be extended at least twice each year to show the progress of the mine workings.

Mine maps are to be stored in a safe place and shall be available for inspection. A copy of each map must be filed with the West Virginia Department of Energy.

NOTE: Read all of section 22A-2-1 of the West Virginia Mining Laws.

Information on a Mine Map

How is this information shown on the map?

All of this information is shown by many different symbols, markings, and figures placed in particular locations on the map. We will look now at some of the more important of these symbols and markings, paying particular attention to what they look like on the map and what they tell us.

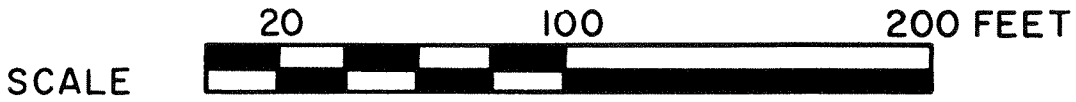
Scale

Each mine map has a scale that allows you to find distances in the mine by measuring distances on the map. Most scales tell you what one inch on the map is equal to in the mine. These scales are written like this. . .

SCALE 1" = 100'

. . . meaning that one inch on the map is equal to 100 feet in the mine.

Some scales look like this. . .



. . .meaning that the length of each small block is equal to 20 feet in the mine and the length of the whole scale is equal to 200 feet in the mine.

The layout of an underground mine and the naming of the entries is often related to the fracture (crack) system which exists in most coal seams. These vertical cracks (which allow the coal to break more easily) are known as cleats. There are two cleats which normally exist in coal seams : the FACE CLEAT which runs east and west (in the coals of the Eastern United States) and the BUTT CLEAT which runs north and south.

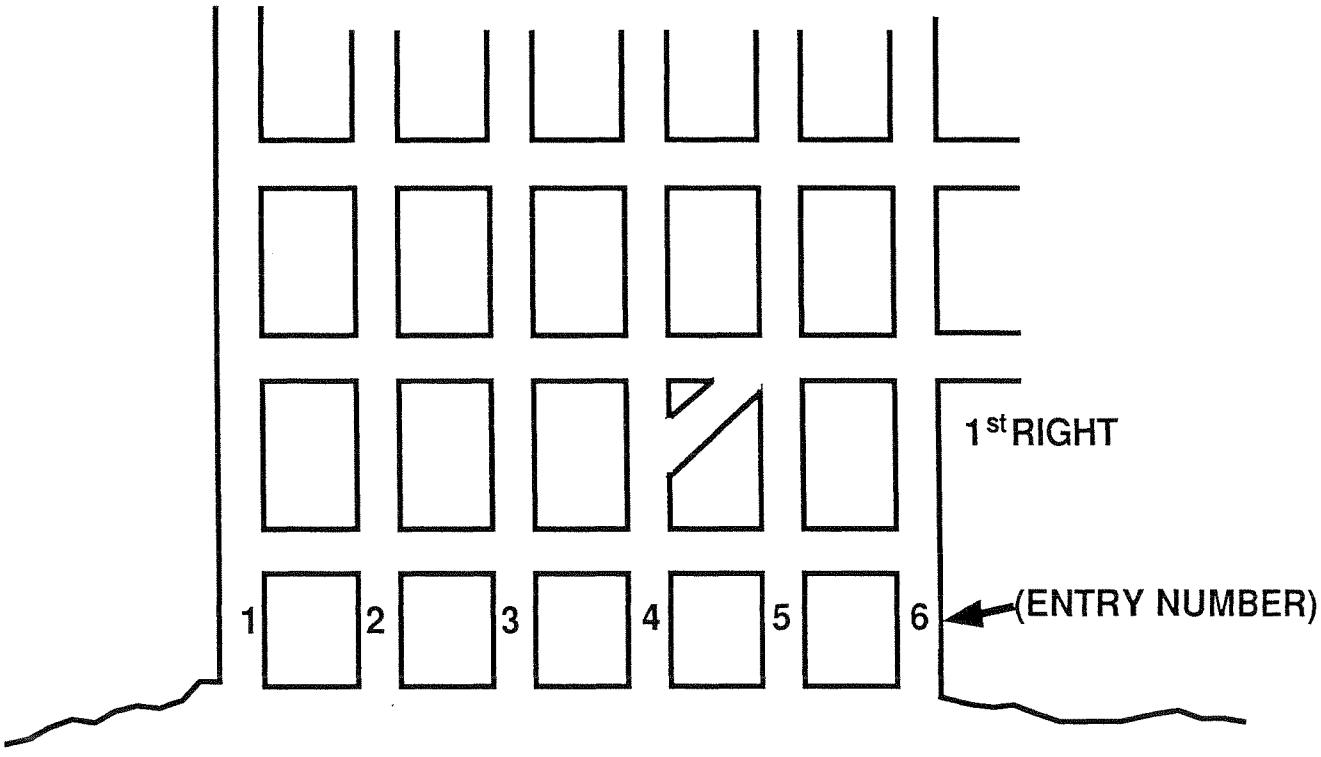
To take advantage of the natural weakness that exists along these cleats, many mines are laid out so that the openings will be parallel to the cleat system (it makes removing the coal much easier).

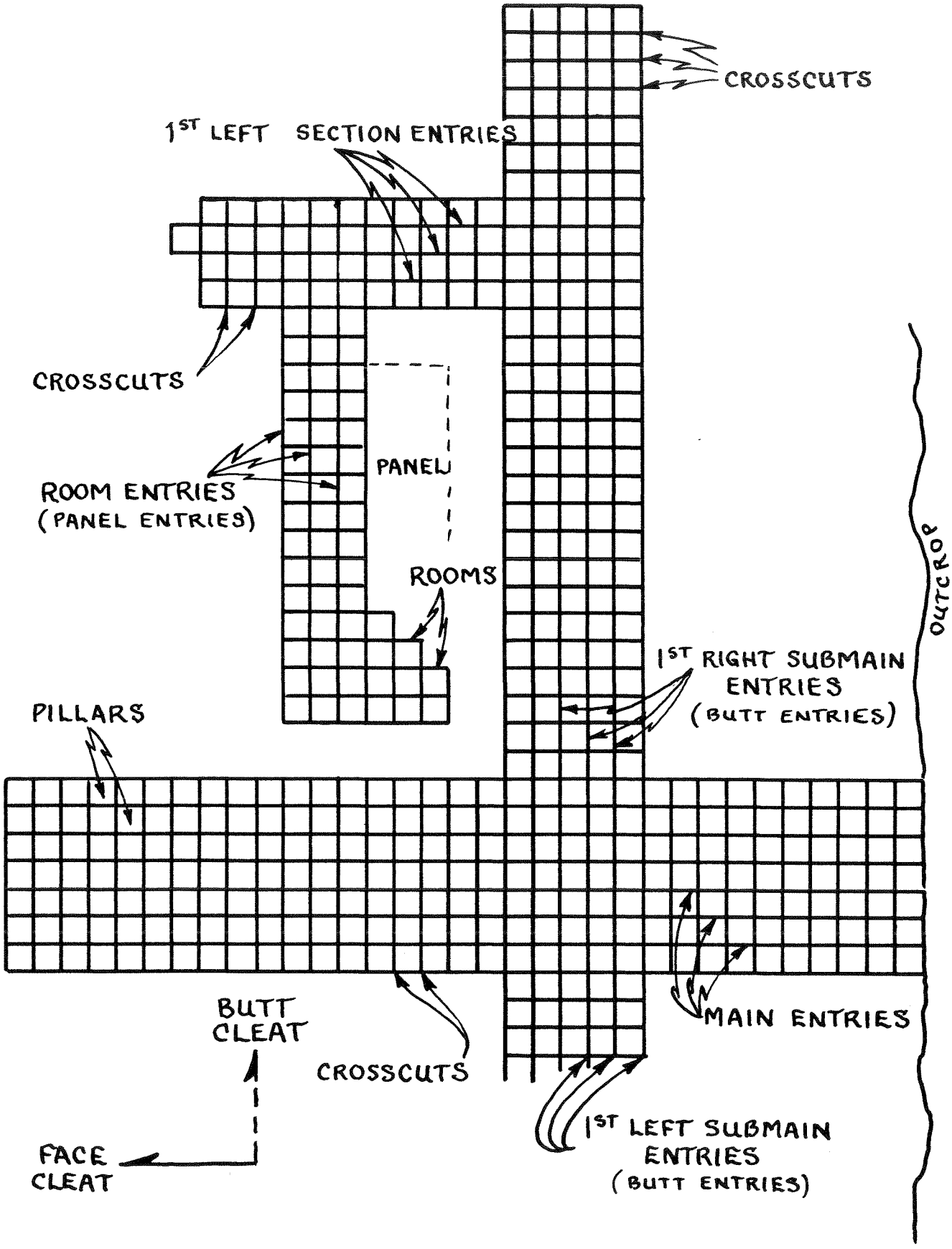
Carefully study the mine layout on the page 6. It shows one system of naming the entries in relation to the cleat system.

Entry Names and Numbers

The main entries and the entries in each section are numbered from left to right (as you face the direction the entries are being driven). Note the numbers 1 through 6 on the map at the top of the next page.

The entries are also given names which appear on the mine map. These names are chosen in a way that will help locate the entry. For example, the first set of entries driven to the right off the main entries will be called 1st RIGHT OFF MAIN or simply 1st RIGHT.



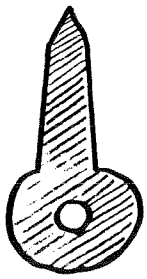

CROSSCUTS
1ST LEFT SECTION ENTRIES
CROSSCUTS
PANEL
ROOM ENTRIES
(PANEL ENTRIES)
ROOMS
OUTCROP
1ST RIGHT SUBMAIN
ENTRIES
(BUTT ENTRIES)
PILLARS
MAIN ENTRIES
BUTT
CLEAT
CROSSCUTS
1ST LEFT SUBMAIN
ENTRIES
(BUTT ENTRIES)
FACE
CLEAT

Survey Stations

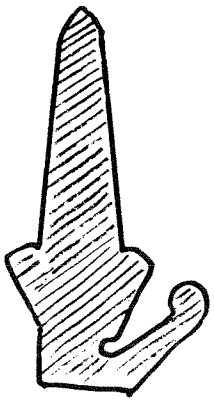
Underground surveying work is needed for two principal purposes. First, mine openings, passageways, and working areas must be located properly according to the engineering design of the overall plan for the mining operation. Secondly, the progress of the mining work must be measured, located, and kept up-to-date so that maps can be made to show where past mining has taken place, where the mining is current, and where it is projected to be in the future. Thus, surveys are used to locate the centerlines by which a mine opening will be driven, station points (called spad stations underground), locations for turning a mine opening from one direction to another, and for all other reasons that definite locations must be established to carry out the engineering plan of the mining operation. When the mine openings and working places have been made, or have advanced during a given period, surveys are made to obtain data with which to plot maps of the work that has been done.

Two types of mine spads:

1 3/8"

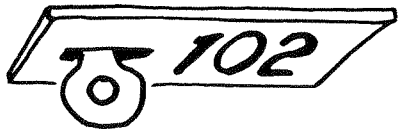


2"



The mine spad, above, is installed in the roof by drillling a hole, about 2 in. deep by 1/2 in. diam., with a star or twist drill. A wooden plug is inserted in the hole and the spad is driven into the plug. It can be knocked to either side to provide alignment. It is important that the hole be drilled on correct alignment and distance as provided for by centerline projections which are based on the engineering design for the mine layout.

After the spad is in place, a small metal tag is attached to it. This tag has a number on it as shown below. . .

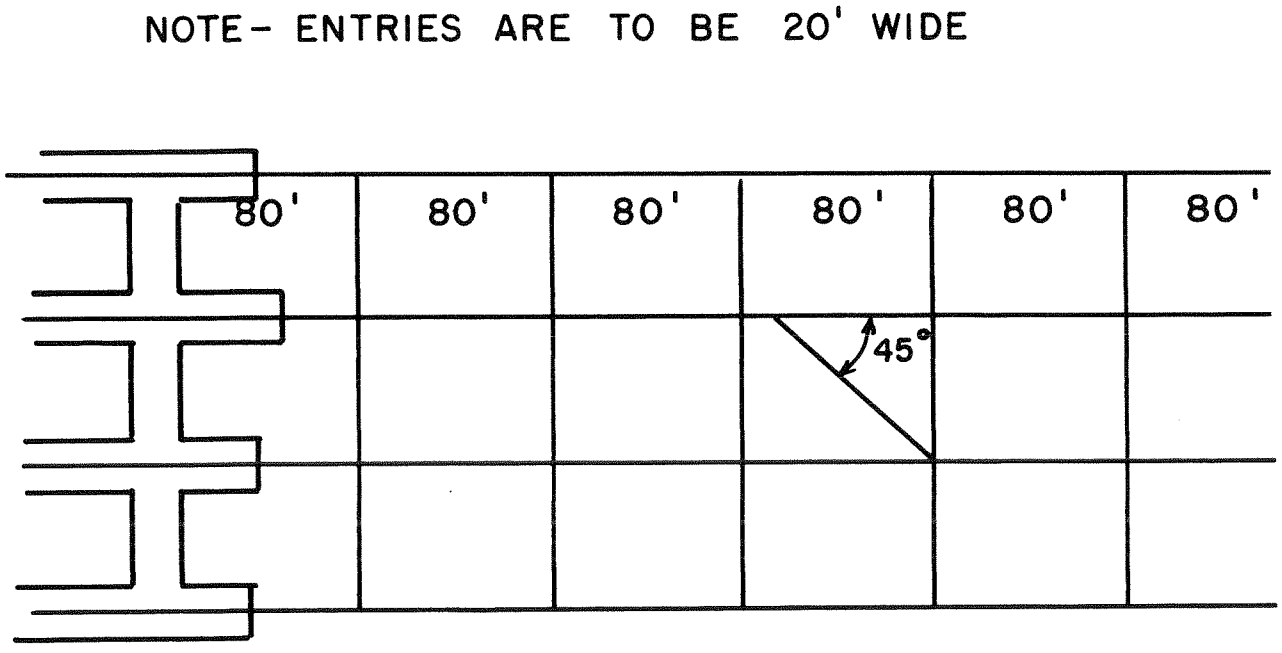


Every time a spad station is placed in the mine, there is also one placed on the mine map. On the map the station would look like this. . .

Projections

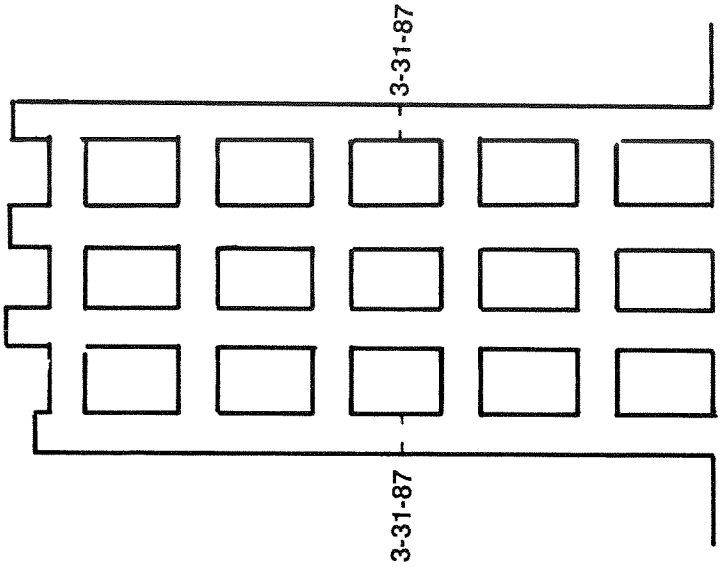
Another very important kind of information found on a mine map is the location, width, and length of future entries and crosscuts. This information is called projections and it is made up of projection lines, notes, and figures drawn on the map.

As mine entries and crosscuts are driven, they must advance according to a plan or design. For this reason, we must establish imaginary lines of direction along which the entries will advance into the coal seam. The lines are called centerline projection lines and are drawn on the planning map when the mine layout is being designed. These projection lines are transferred to the actual mining operation by surveying and are marked in the mine by lining up spad stations. Centerlines are moved up as the mining progresses and are very often painted or chalked on beyond the working places. The numbers written near the projection lines tell the distances between entries and crosscuts, and the note above the projection lines gives other information such as the width that the entries should be driven.



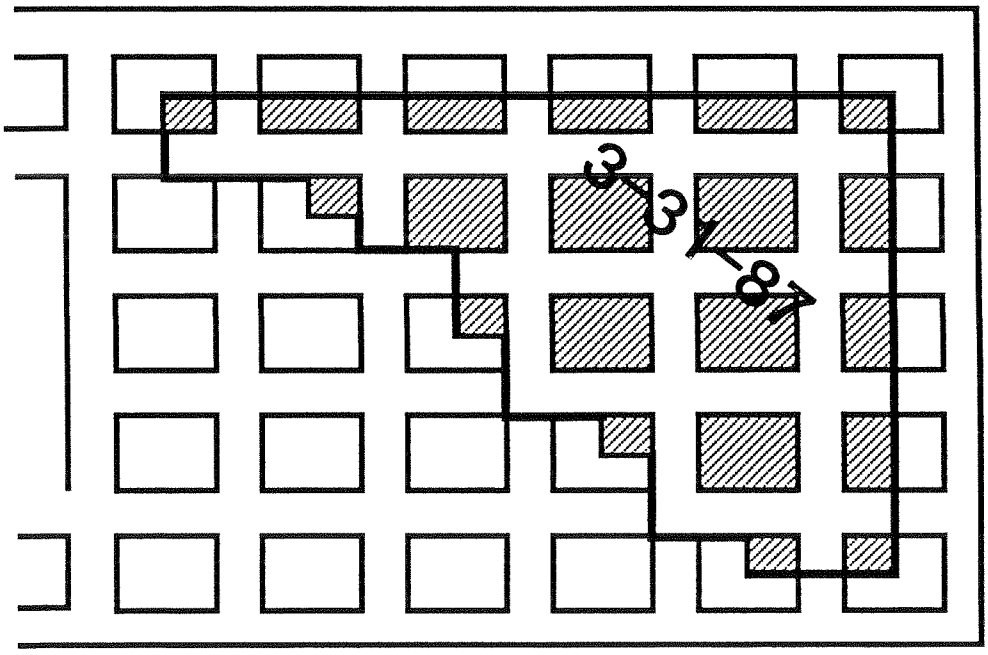
Dates

If you want to know <u>when</u> a certain area of a coal mine was mined, you can tell by looking at the dates that appear on the mine map. On a regular section, the date is written on either side of the section as shown by the 3-31-87 below.

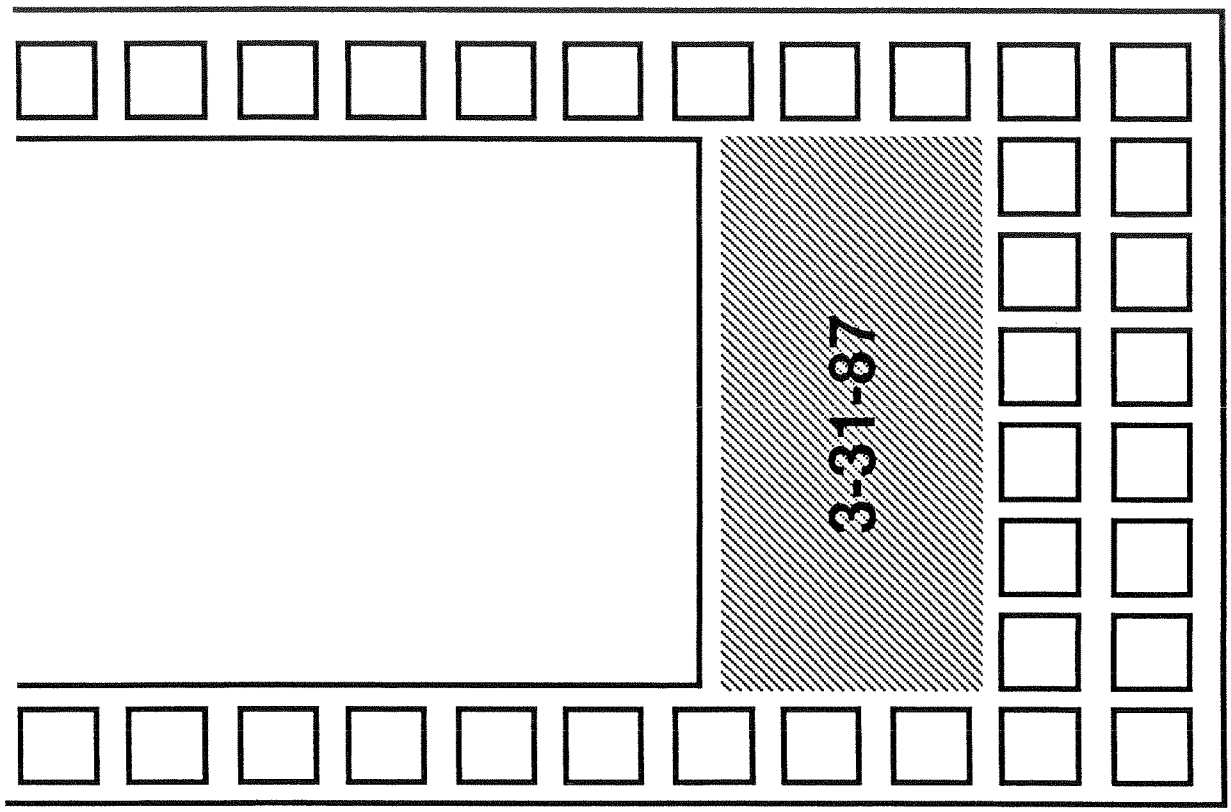


This means that the working faces were driven to that point by the end of March, 1987.

On a pillar section the dates are shown differently. As the pillars are removed, cross lines are drawn through them. At the end of each quarter of the year (each three months), the progress of the pillar work is outlined and the date is written in across the mined out pillars. See the example below.



On longwall sections, the dates are shown in much the same way as on a pillar section. . .



Thickness of the Coal

At various locations on the mine map there are small letter-number combinations that look like this. . .

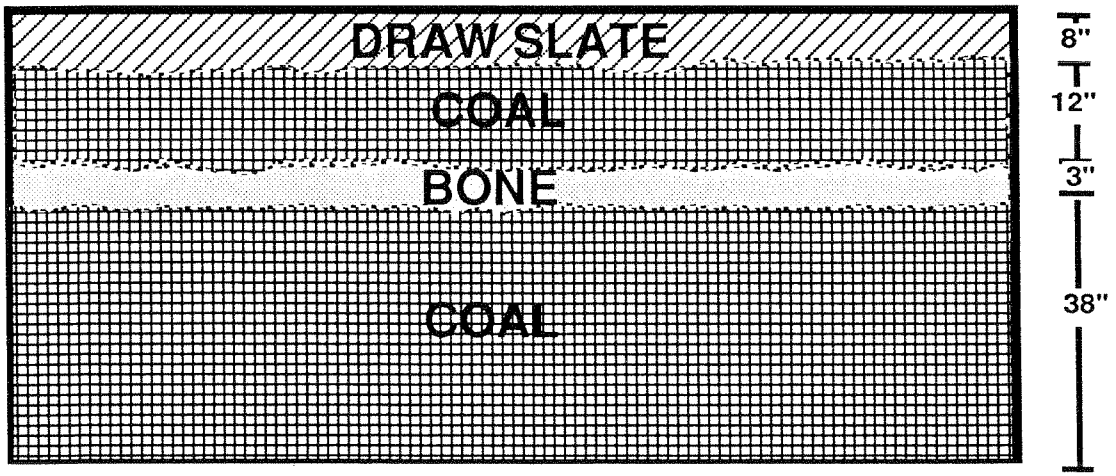
DS - 6

C - 52

The letters stand for the different layers of material that make up the face or rib at that location and the numbers are the thickness, in inches, of each material. In the example on the previous page, the face is made up of six inches of draw slate*(DS) and 52 inches of coal (C). Other letters that might be used are B (bone)** and R (rock). A code that looked like this. .

DS - 8
C - 12
B - 3
C - 38

. . . would mean that the face is made up of eight inches of draw slate, 12 inches of coal, three inches of bone and 38 more inches of coal.

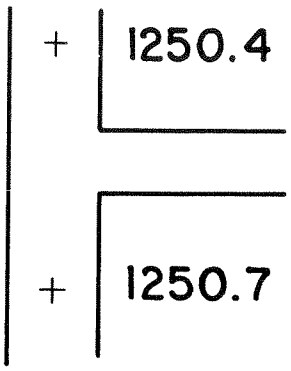


* draw slate: A soft slate, shale, or rock approximately 2 inches to 2 feet in thickness, above the coal, and which falls with the coal or soon after the coal is removed.

** bone: A hard coal-like substance high in noncombustible mineral matter; often found above or below, or in partings between layers of relatively pure coal.

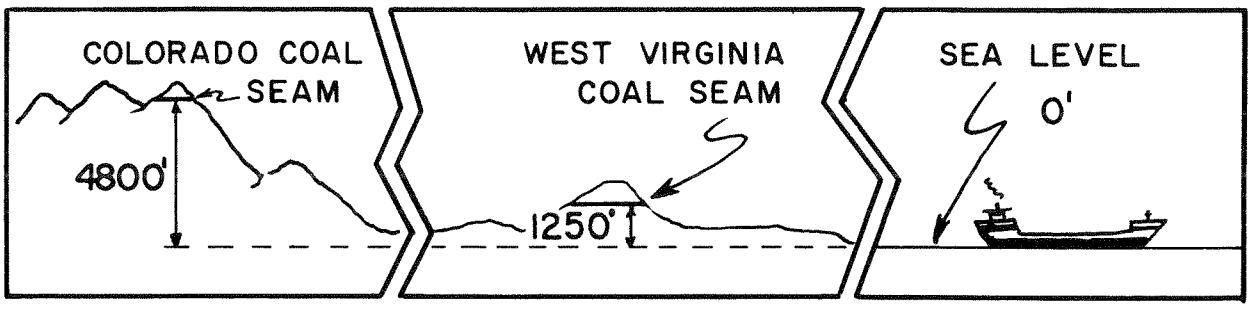
Elevations

The floor of a mine is not level; there are high places and there are low places and the whole coal seam might be on a grade. Since it is very important to good haulage and drainage to know about these differences, the height of the floor of the mine is placed on the map. These heights are called elevations and look like this. . .



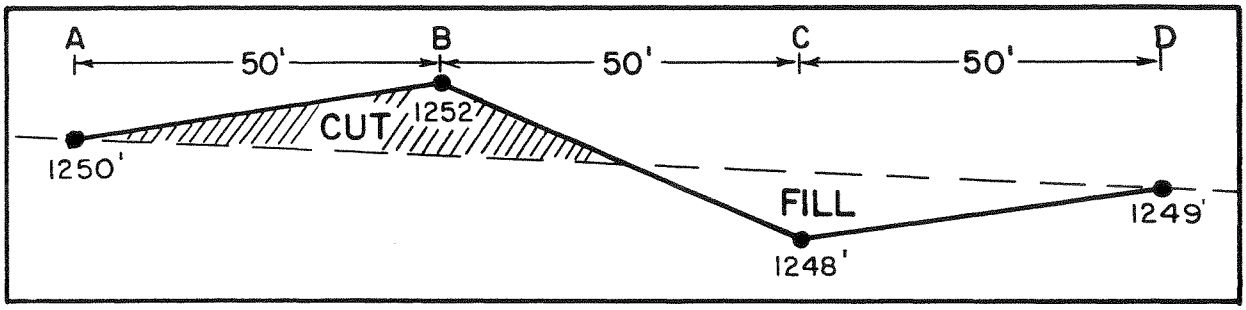
They are usually written on the center line of the main haulage ways about 50' apart. The small cross mark is made to show the exact location in the entry where the elevation was taken by the surveyor.

Sea Level - The elevations are always given in feet above sea level. The average sea level was selected many years ago as the basis for all elevations. This makes it possible for you to compare any elevation with any other elevation.



From this you can tell that the Colorado coal seam is 3550 feet higher than the West Virginia coal seam.

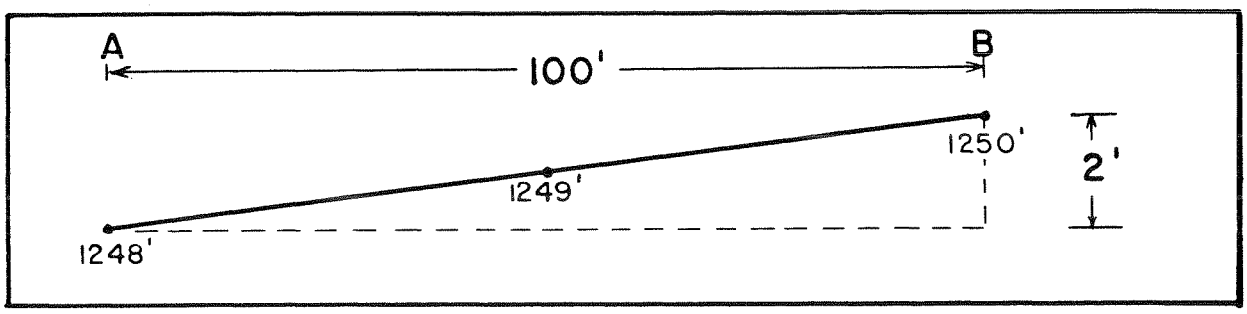
Inside the mine, the elevations will be used by the engineers to determine how much bottom must be removed or added to make for smooth haulage or proper drainage.



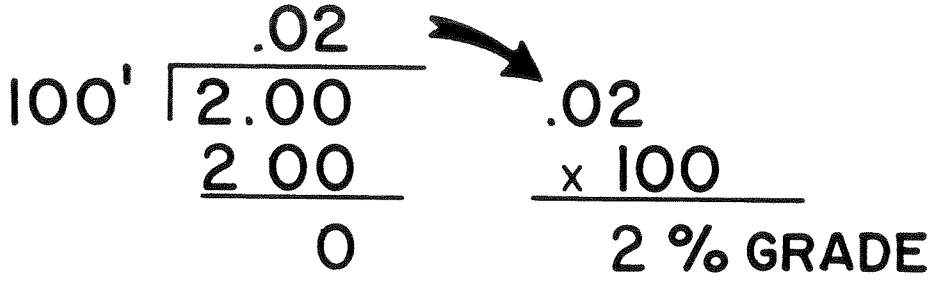
Look at the drawing above. It shows the profile of 150' of the main haulageway. The elevation of each point is given below the dot. To smooth the haulageway between point A and point D (along the dotted line), the area below point B marked CUT must be removed and the area above point C marked FILL must be filled in.

Percent Grade

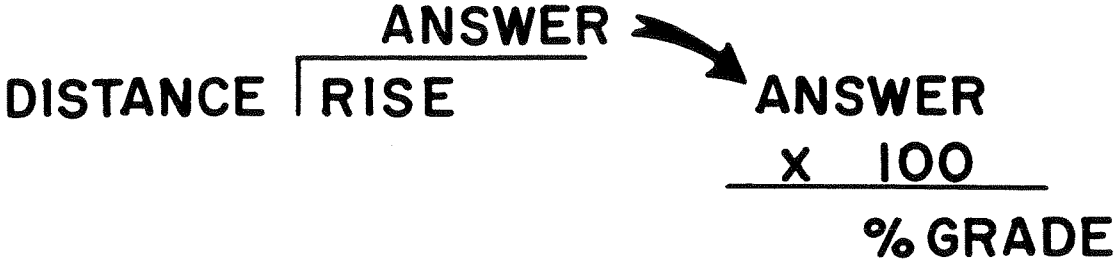
The elevations are also used to figure the percent grade of the mine floor. The percent grade tells you how many feet the floor rises in 100 feet. For example, a 2% grade means the floor rises 2 feet in 100 feet.



The elevation of point A is 1248' and the elevation of point B is 1250', giving us a difference of 2'. The distance between the two points is 100'. To find the percent grade , we must divide the rise (2') by the distance (100') and multiply the answer by 100. Let's try it.



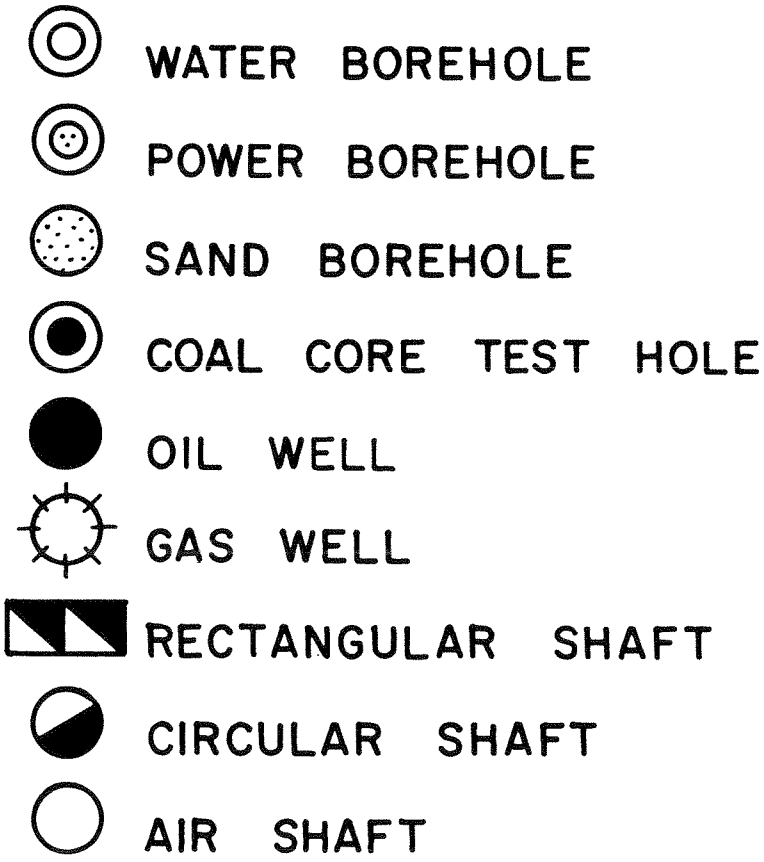
No matter what the rise is or what the distance is. . .



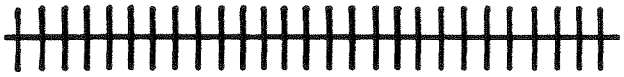
Boreholes

A borehole is a hole that has been bored from the surface of the ground to the inside of a mine, to the coal seam, or through the coal seam. They vary in size from as small as 2 inches in diameter to as large as several feet in diameter. The size of the borehole is determined by what it is to be used for. Small boreholes can be used to pump water out of the mine or to take electrical power into the mine. Core drillings can be made to find out what the coal seam is like in areas that have not been worked. Larger boreholes can be used for air passages, entrances to the mine, or for escapeways.

Most mines have some kind of borehole and the location of all boreholes will be shown on the mine map. The map symbols for many of the important boreholes are shown below.

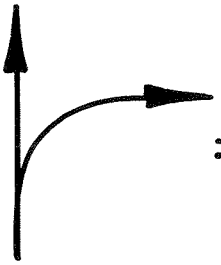


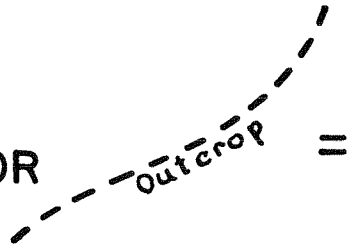
Other Map Symbols

1.  = TRACK

2. △ OR ▲ = LOADING POINT

3.  = BELT

4.  = AIR SPLIT

5.  OR 

= OUTCROP

Study Questions

1. List five kinds of information found on a completed mine map.

2. Who must supervise the mapping of a coal mine?

3. If you were to see this figure, +1430, on a mine map, what would it tell you?

4. What are projections on a mine map?

5. If a mine floor has a 20 foot increase in elevation over a distance of 500 feet, what is the percent grade of the mine floor?

6. All elevations are based on what standard elevation?

7. What are survey stations?

(Answers on next page.)

Answers

1. Any five of the following: scale, elevations, ventilation controls, survey stations, boreholes, air current, projections, dates, or any of the information listed in Sec, 22A-2-1 of the W. Va. Mining Law.

2. A competent engineer or land surveyor.

3. The point is 1430 feet above sea level.

4. Projections are figures, notes, and lines appearing on a mine map that show where future entries are to be driven, how wide they should be, the distances between them, etc.

5. 4%

6. Sea level

7. Survey stations are points located in a coal mine by an engineer. To identify each station a small numbered tag is attached to the station and at the same time the station is marked on the mine map.

Part 2

Ventilation

Introduction to Ventilation

Ventilation is the coursing of fresh air through a coal mine. It is one of the most important phases of coal mining because of its direct effect on the health and safety of the miners.

The purpose of ventilating a coal mine is to provide a safe, healthy atmosphere in which the miners can work. A good ventilation system does this by causing enough fresh air to flow through the excavations and around the working places to maintain the most ideal temperature and velocity (air speed) for safe and efficient work, with a minimum amount of dangerous gases or dust in the air.

As mining methods have progressed, allowing more and more coal to be removed from deeper and deeper mines, proper ventilation has become more difficult. As a result, mine ventilation has nearly become a science in itself. An extensive ventilation system has been developed to meet the needs of the modern mines.

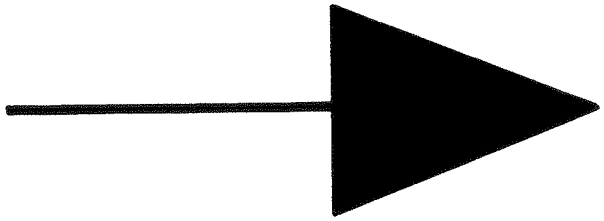
This ventilation system is made up of fans which push or pull an air current through the mine and a series of controls which direct that air current to all working areas, haulage ways and service areas of the mine.

The air current is either pushed through the mine by a blower fan, or pulled through the mine by an exhaust fan. As it moves through the mine, a system of ventilations controls direct the air current to all working areas, haulage-ways and service areas of the mine. This system of ventilation controls is made up of nine separate controls: temporary stoppings, permanent stoppings, box-checks, overcasts, undercasts, check curtains, line brattice and mine doors. They not only control the direction of the air flow, but they also control the amount of air that reaches each area of the mine.

The ventilation system also includes auxillary ventilation which is a method of supplementing the main ventilation current by using a small fan to draw air from the main air current and force it (through tubing or pipes) into a particular working place.

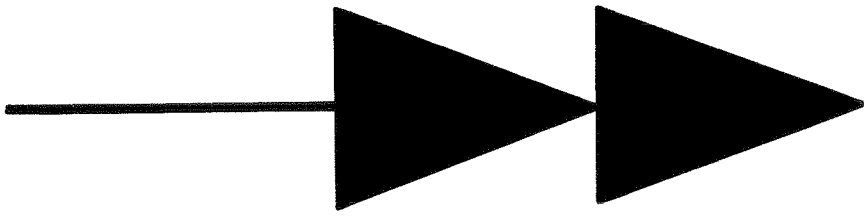
The Air Current

When you are looking at a mine map or when you are ventilating a map, it is very important that you know where the air current is and which direction it is moving. The air current therefore is marked with a series of arrows that show its location and its direction.

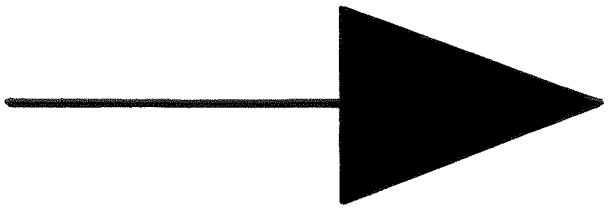


Many mine maps use this symbol to show the entire air flow in the mine—both intake and return.

Some mine maps, however, use a double headed arrow to show the intake air. .



. . . and a single headed arrow to show the return air. . .



IMPORTANT: On some mine maps these arrows are just the opposite. The double-headed arrow shows the return and the single -headed arrow shows the intake. Look at the legend to see how they are used.

Also, on some maps, different colored arrows are used to show the intake and the return. Again, check the legend.

Types of Mine Fans

Mine fans may be classified according to their use or purpose as:

1. Main Fan - This fan produces the initial ventilating pressure and is usually located on the surface. The main mine fan may be further classified according to their construction as:

    a. Centrifugal. (Radial flow)

    b. Axial-flow. (Including both propeller and disc type)

Centrifugal fans take air in at the side of the fan wheel and discharge it at the circumference of the fan rotor.

Axial-flow fans take in air on one side of the fan wheel, and force it to flow to the opposite side of the wheel by displacement of the air by rotating vanes.

2. Booster Fan - A booster fan is primarily used for boosting the pressure of the main mine fan, and is located underground. It is usually of the propeller or disc type because the requirements are not large.

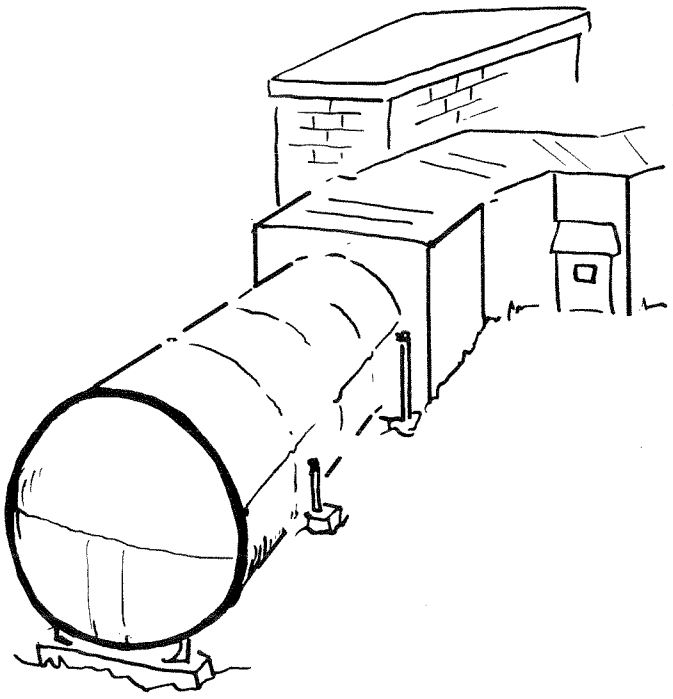
3. Auxiliary Fan - Auxiliary fans are small blower-type fans used with tubing to ventilate the working places. They are used instead of brattice cloth.

Fan

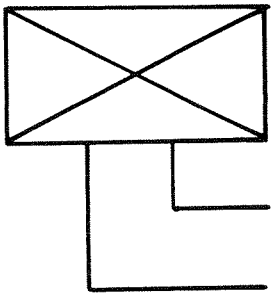
The main mine fan is the mechanical means of providing the air flow needed to ventilate a coal mine.

Law requires that main fans be installed in fireproof housings and that they be installed at least 15 feet to one side of the mine opening. The fans must have explosion doors or weak walls so that the pressure caused by an underground explosion would be relieved without damaging the fan.

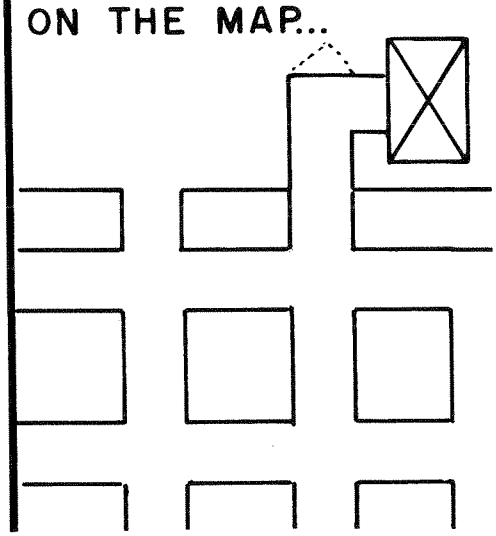
AT THE MINE...



THE SYMBOL...



ON THE MAP...

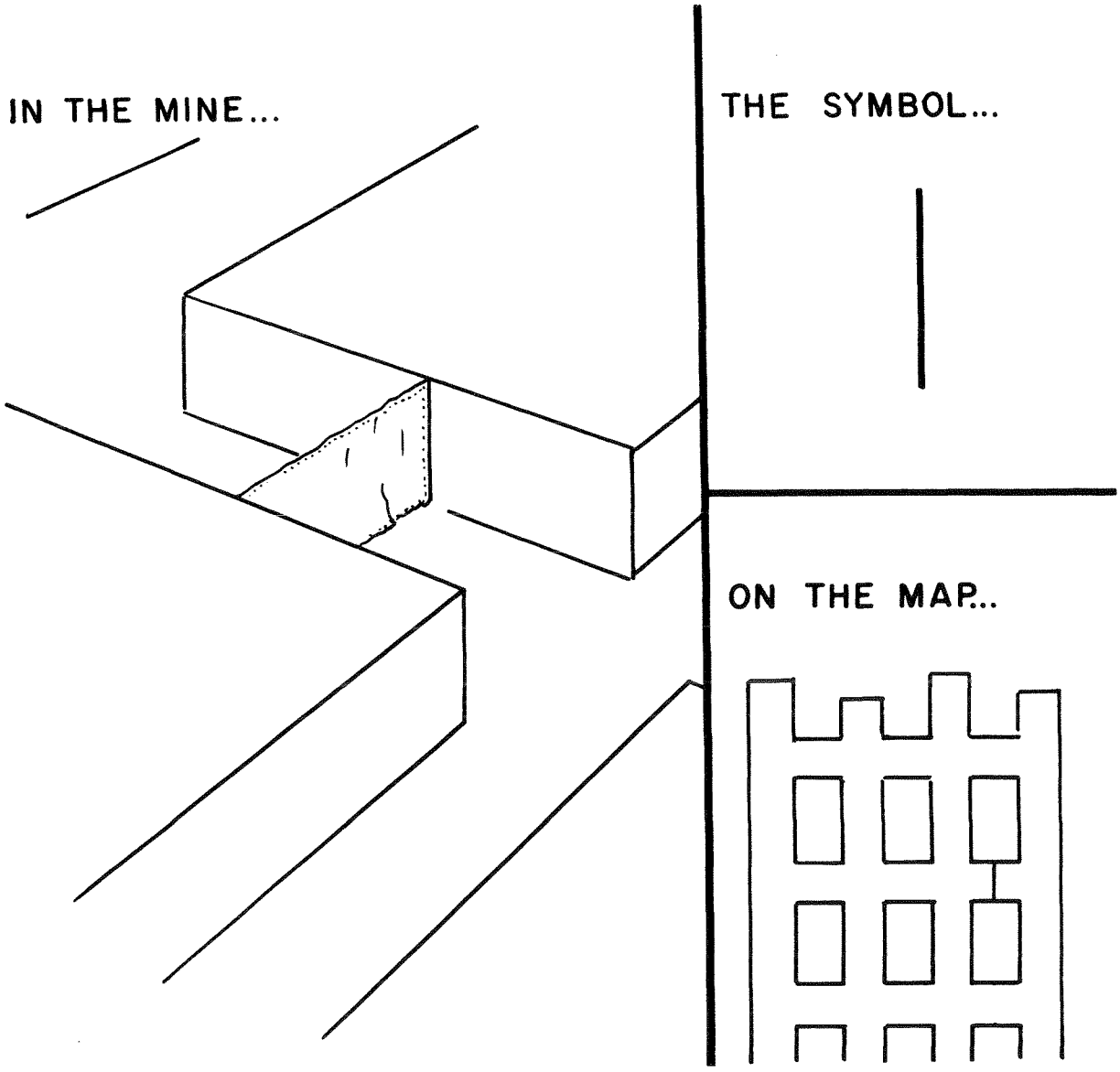


Stoppings

In general, stoppings are airtight walls built across mine passages. They are put there for two main reasons, one, to direct the air flow through the mine and, two, to prevent the mixing of the clean air in the intake passages with the dusty, gas-filled air in the return air passages. Stoppings can either be temporary or permanent.

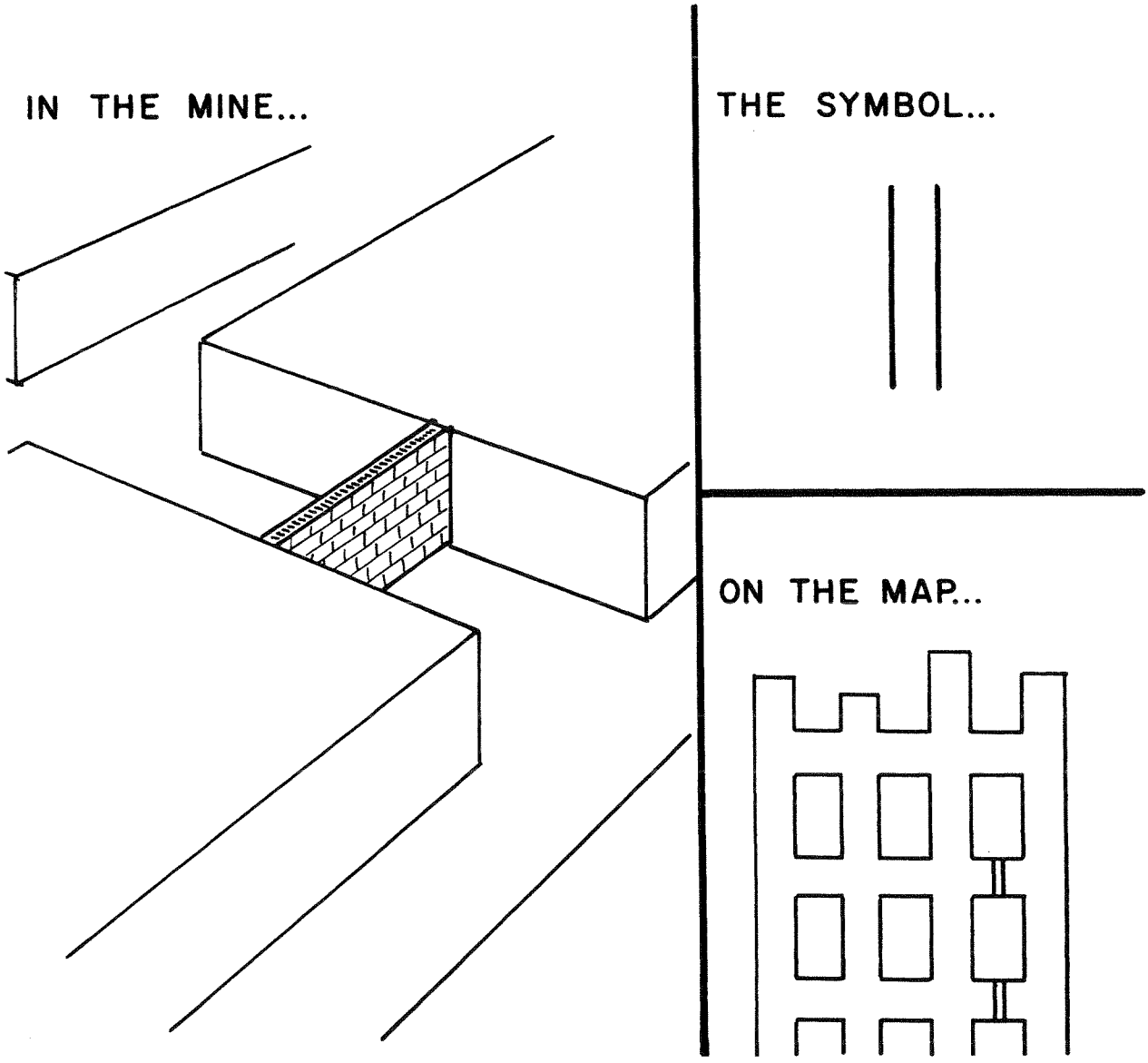
Temporary Stoppings

Temporary stoppings are stoppings that are made of jute fabric, canvas, rough lumber covered with plastic, or telescoping sheet metal. Since they are easy to build and easy to take down, they are used in active working areas where the air flow will be changed often.



Permanent Stoppings

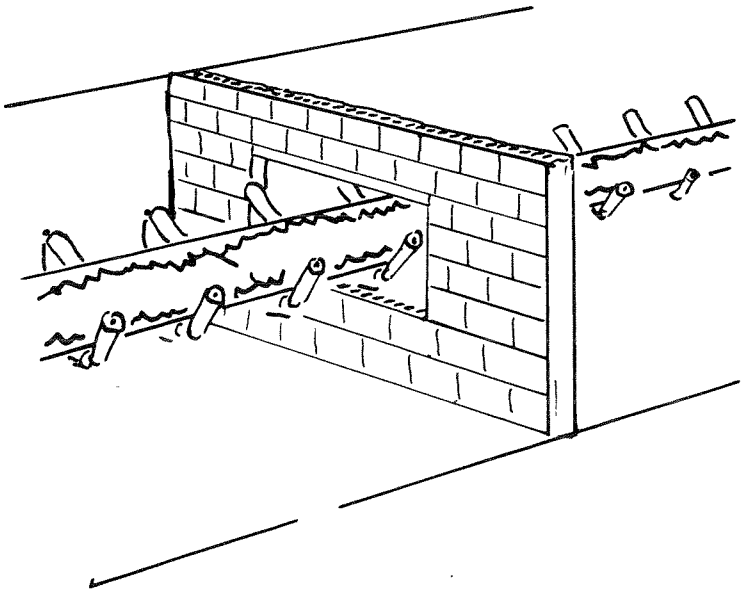
Permanent stoppings are built of concrete blocks or metal panels. They are permanently constructed and are sealed against the roof, rib, and floor. They are not easy to take down, so they are used for long-term control of the air flow. That means, they are put in the places where the air flow will not need to be changed for a long time.



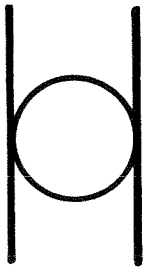
Box-Checks

Another type of stopping is the box-check. A box-check is simply a stopping with a hole in it that allows a conveyor belt or a pan line to pass through the stopping. Box-checks are used to isolate a conveyor belt line or pan line from the main air flow. They are placed at each end of the belt (as near each end as possible) to stop both the intake air and return air from flowing across the belt line.

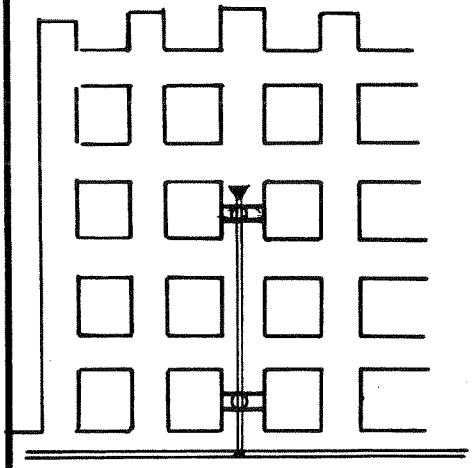
IN THE MINE...



THE SYMBOL...

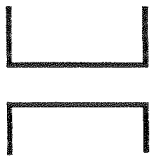


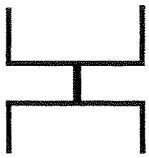
ON THE MAP...



Study Questions

1. The symbol for a permanent stopping is:



2.  is the symbol for a _____ _____.

3. A box check is used with what piece of mining equipment?_____

4. Match: A. permanent stopping
B. temporary stopping
C. box-check

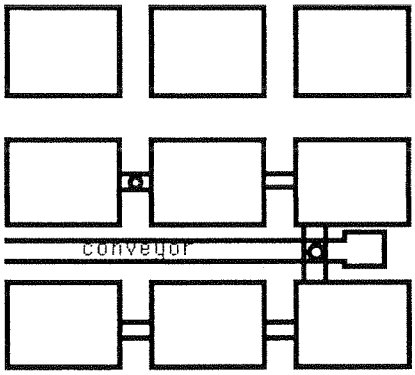
_____1. fabric or plastic, easy to build and take down

_____2. built with a hole or opening in it

_____3. concrete block, built to remain for a long time

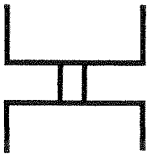
5. You need to stop the ventilating air current from going into a mine entry, but you know that the entry will be opened in one week to begin a new working place. What ventilation control would you use?

6. Draw a circle around the ventilation control symbol that is drawn in the wrong place.



(Answers on the next page)

Answers

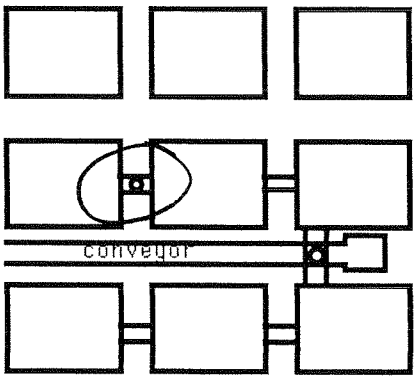
1. 

2. Temporary stopping

3. Conveyor belt (or pan line)

4. B-1, C-2, A-3.

5. Temporary stopping

6. 

Splitting of Air

In small mines, the air current is coursed around all of the active working faces as well as the inactive ones and then is returned to the outside atmosphere. This system of ventilation is known as continuous ventilation because the air current is not split. As soon as the mine grows to more than one section, however, and the number of men that are being supplied air increases, it becomes necessary to divide the air current into each section so that all miners are provided with fresh air.

There are several very good reasons for splitting the air current:

1) Splitting allows for complete control of the air in any one section.
2) Some sections of the mine may require more air than others due to gassy conditions.
3) When splits are used, the foul or gassy air from one section is taken directly to the returns without being taken over the other sections.
4) When each section is on a different split, a fire or explosion in a particular section may not cause an interruption of the ventilation in the other sections.
5) When several splits are used, the velocity of the ventilating current is lowered which helps reduce the dust explosion hazard.
6) Since the velocity of the ventilating current is lowered, the power cost for ventilation will be reduced.

EQUAL SPLITS: When two or more airways have the same length, size, and resistance*, they are termed equal splits. The amount of air that flows through equal splits will be the same and the power required to force the air through equal splits will be the same.

UNEQUAL SPLITS: Two or more airways which have different lengths, sizes, and resistance are termed unequal splits. These splits will carry different amounts of air and will require different amounts of power to force the air through.

Air will split naturally in a mine that has two or more sections but natural splitting will seldom, if ever, get the right amount of air to each section. To help get the right amount to each section, some mechanical way of adjusting the resistance in the sections is needed. (You might think of it as making unequal splits equal!) This is done by using a regulator.**

*See page 30
** See page 31-32

Mine Resistance

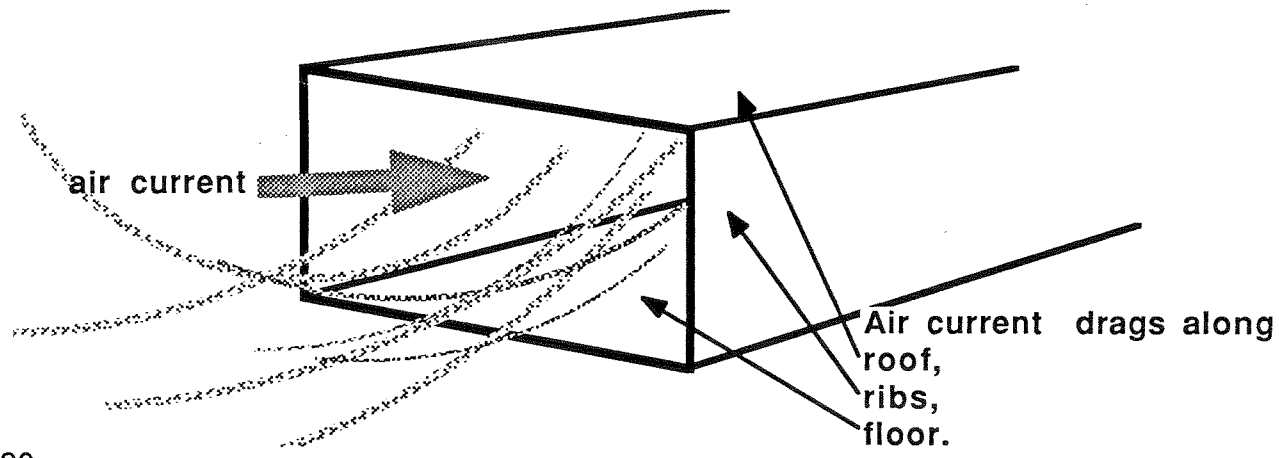
Mine resistance is the resistance offered by a mine to the passage of an air current. You might think of it this way: as the air is pushed or pulled through the mine, it drags along the ribs, roof, and floor. This dragging makes it hard for the air to get through and is called mine resistance. Resistance is also caused by the turbulence created by rough passage and obstacles in the mine passages.

Different mine sections have different amounts of resistance. Why? Because there are three things that determine how much resistance a section has. One, the size of the section (a large section will have more resistance than a small section); two, the condition of the roof and ribs (a section with rough roof and ribs will have more resistance than a section with smooth roof and ribs); and three, the size of the entries (small entries have more resistance than larger entries).

Now, when the air current comes to a mine section where the resistance is high (that is, where it is hard for the air to travel) most of the air will go right on by looking for a section where the resistance is lower. If the air current comes to a section where the resistance is very low, most of the air will go through that section and into the return , leaving any sections beyond that without ventilation.

What we need to do then is to balance the amount of air that flows into the sections so that enough air gets to the working places of all of the sections. We can do this by increasing or decreasing the resistance in the sections. Remember this: when there is a lot of resistance, there will be a small amount of air; when there is just a little resistance, there will be a lot of air. (Regulators are discussed on pages 31 and 32).

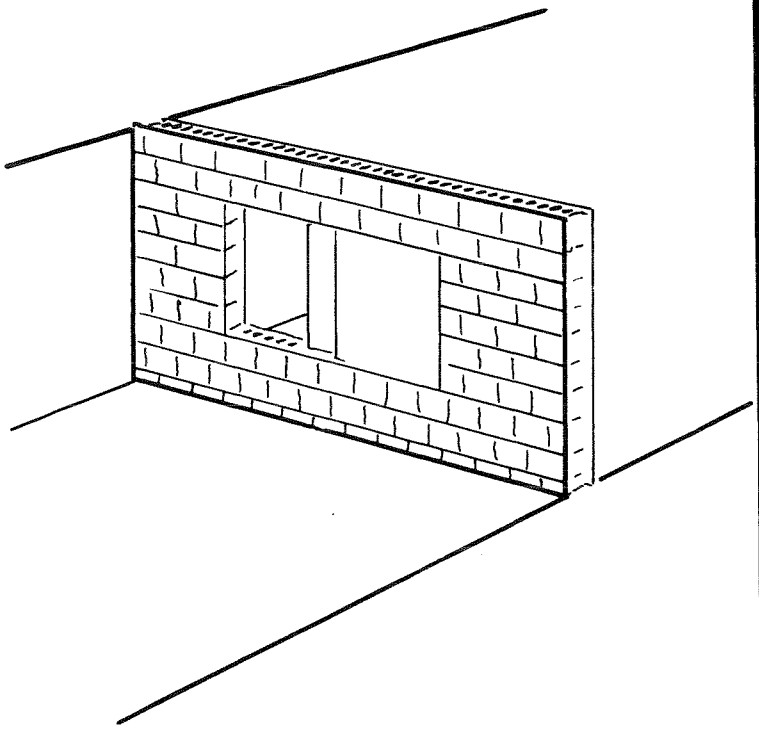
Now you're probably asking yourself, "How can we increase or decrease the resistance in a section?" Remember , we said that three things determine how much resistance a section will have: size, condition of roof and ribs, and size of entries. OK. We can't very easily change the size of the section, and we can't very easily change the condition of the roof and ribs, but we *can* very easily change the size of the entry. How? By using a regulator.



Regulators

Regulators are adjustable doors or windows built into a stopping in the return airway near the end of a section. They are used to adjust the mine resistance in a section by opening or closing the door allowing just the right amount of air to flow through the section. Opening a regulator lowers the resistance, causing an increase in airflow; closing a regulator increases the resistance, causing a decrease in airflow. Regulators are essential to mine ventilation because they proportion the air to meet the needs of each air split.

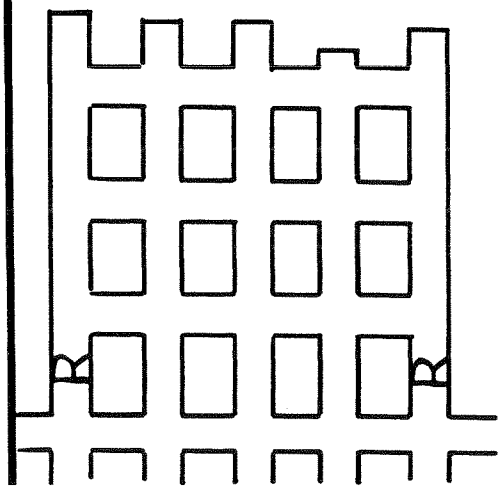
IN THE MINE...



THE SYMBOL...

R

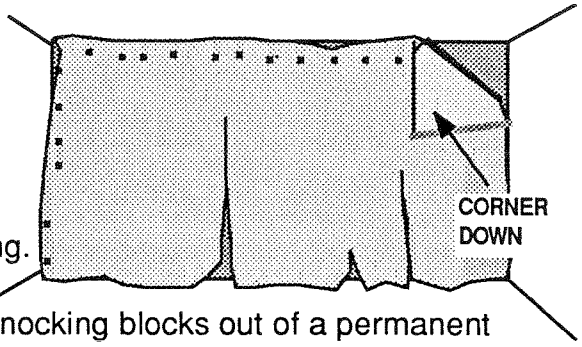
ON THE MAP...



All regulators are not the neat, permanent type illustrated on page 31. In fact, many regulators are made in very simple, temporary ways.

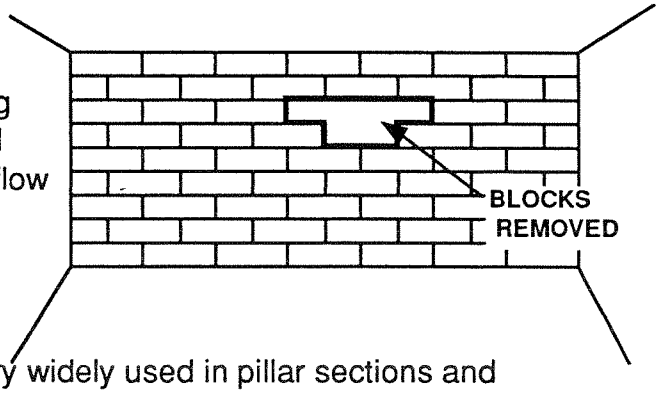
One such regulator is made by simply taking down one corner of a check curtain.

The opening made by the corner lowers the resistance and allows more air to flow. The air flow can be adjusted by lowering the corner more to make a larger opening or tacking it up to make a smaller opening.



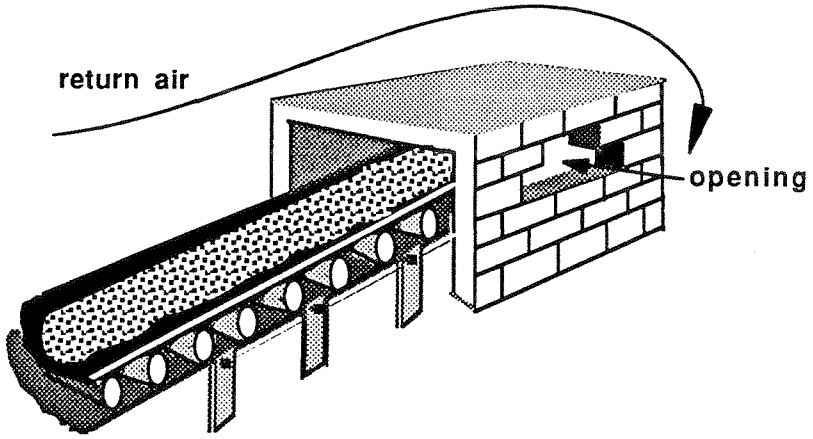
Another type of regulator is made by knocking blocks out of a permanent stopping.

The opening made by the missing blocks lowers the resistance and allows more air to flow. The air flow can be adjusted by removing or replacing blocks.



These types of regulators are very widely used in pillar sections and longwall sections.

A belt regulator can be made by removing blocks from the wall of an overcast through which a belt is traveling. The blocks are removed from the wall (in the return air passage) away from the return air current.

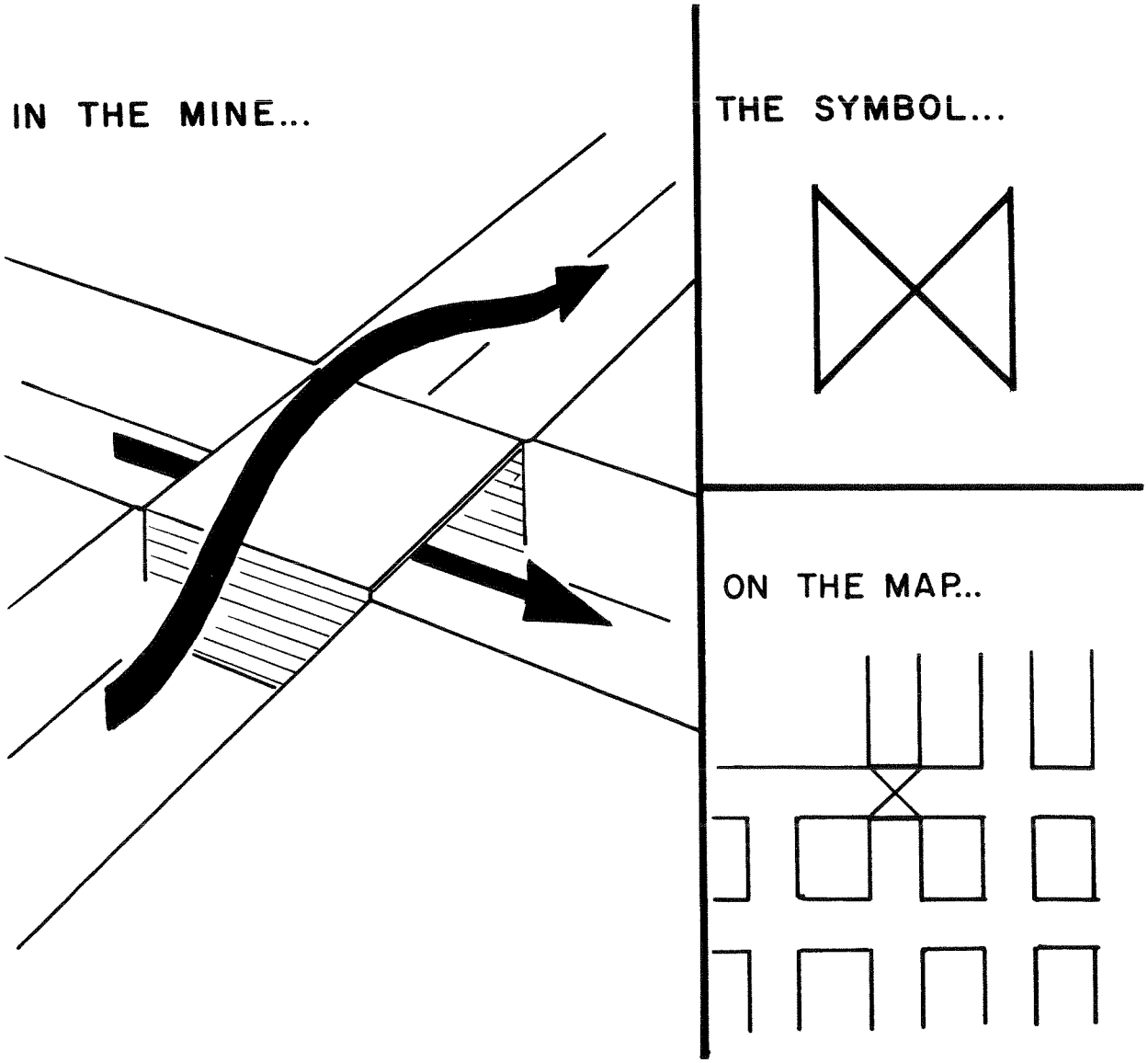


This belt regulator is sometimes shown on a mine map by a new symbol.

. . . the overcast symbol and the regulator symbol combined.

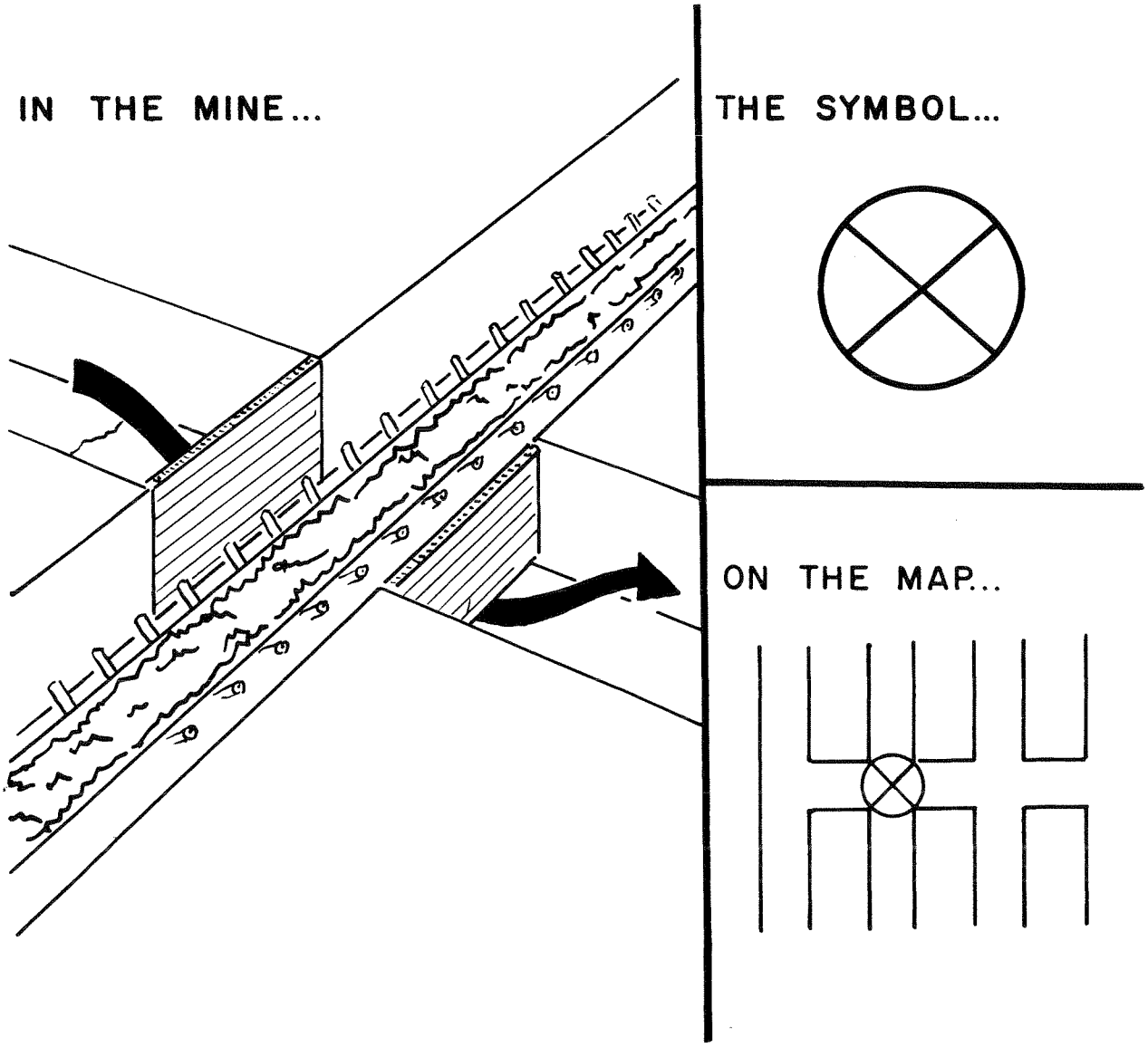
Overcasts

An overcast is an enclosed airway which allows the intake air and the return air to cross without mixing . An overcast acts as both a tunnel and a bridge. It's a tunnel for the intake air to pass through and it's a bridge for the return air to pass over. It's used only at intersections. Overcasts are usually built with concrete block walls sealed against the ribs and floor, and some kind of airtight roof made of pre-stressed concrete, railroad ties or steel beams.



Undercasts

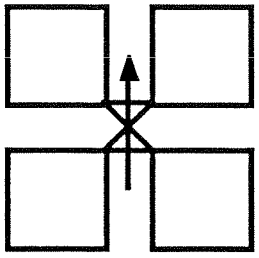
The undercast is similar to the overcast. The difference is that instead of one air current going over the other, it goes under. Undercasts are not used very much because they present several problems. The worst is that they fill up with dirt or water blocking the air current.

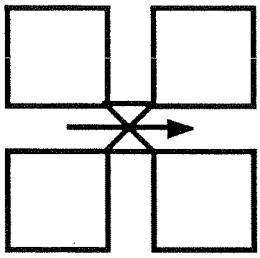


Study Questions

1. A new section has been started in your mine creating an intersection where the intake air and the return air must cross without mixing. This area of the mine is very wet. What ventilation control is needed here?

2. The arrows on the diagrams below show the directions of theintake air current. Which of the overcast symbols is drawn correctly?

A. 

B. 

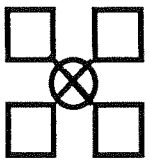
3. The symbol for an undercast is _____.

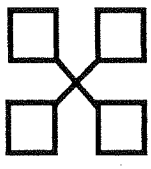
4. An undercast is two permanent stoppings with a pipe or pipes running between them. The return air crosses the intake air by going through the pipes.

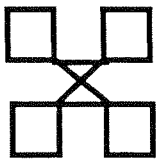
_____True _____False

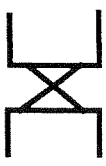
5. Fill in the blanks:
An overcast is a tunnel for the intake air to pass _____and a bridge for the return air to pass _____.

6. Circle the symbols that are correctly drawn and located.

A. 

B. 

C. 

D. 

(Answers on the following page.)

Answers

1. Overcast

2. B

3. 

4. False

5. through, over

6. A, C.

Face Ventilation

With the continued development and the widespread use of continuous mining machines, the difficulty of delivering enough air from the last open crosscut to the working face has increased. State and federal laws as well as good common sense dictate a minimum quantity of air in any coal mine reaching each working face must be 3,000 cubic feet per minute.

Unless the main ventilating air current is distributed directly to the working faces, it is not doing its primary job. There are two basic ways of ventilating faces: blowing and exhausting. Both ways make use of two ventilation controls, check curtains* and line brattice**.

The blower method sends air to the face by directing it between the rib and the line brattice through the narrower of the two openings. The return air is taken away from the face through the larger division of the entry.

1. Advantage of the blower method.
a. It provides a strong velocity of air to the face.
b. It dilutes face gases very well.
c. It helps to maintain the clearance between the rib and the brattice.
2. Disadvantages of the blower method.
a. It carries methane gas liberated at the face over the mining machine.
b. It blows dust from face cuttings over the operator.
c. It makes it necessary to pass through check curtains when hauling coal to the loading point.

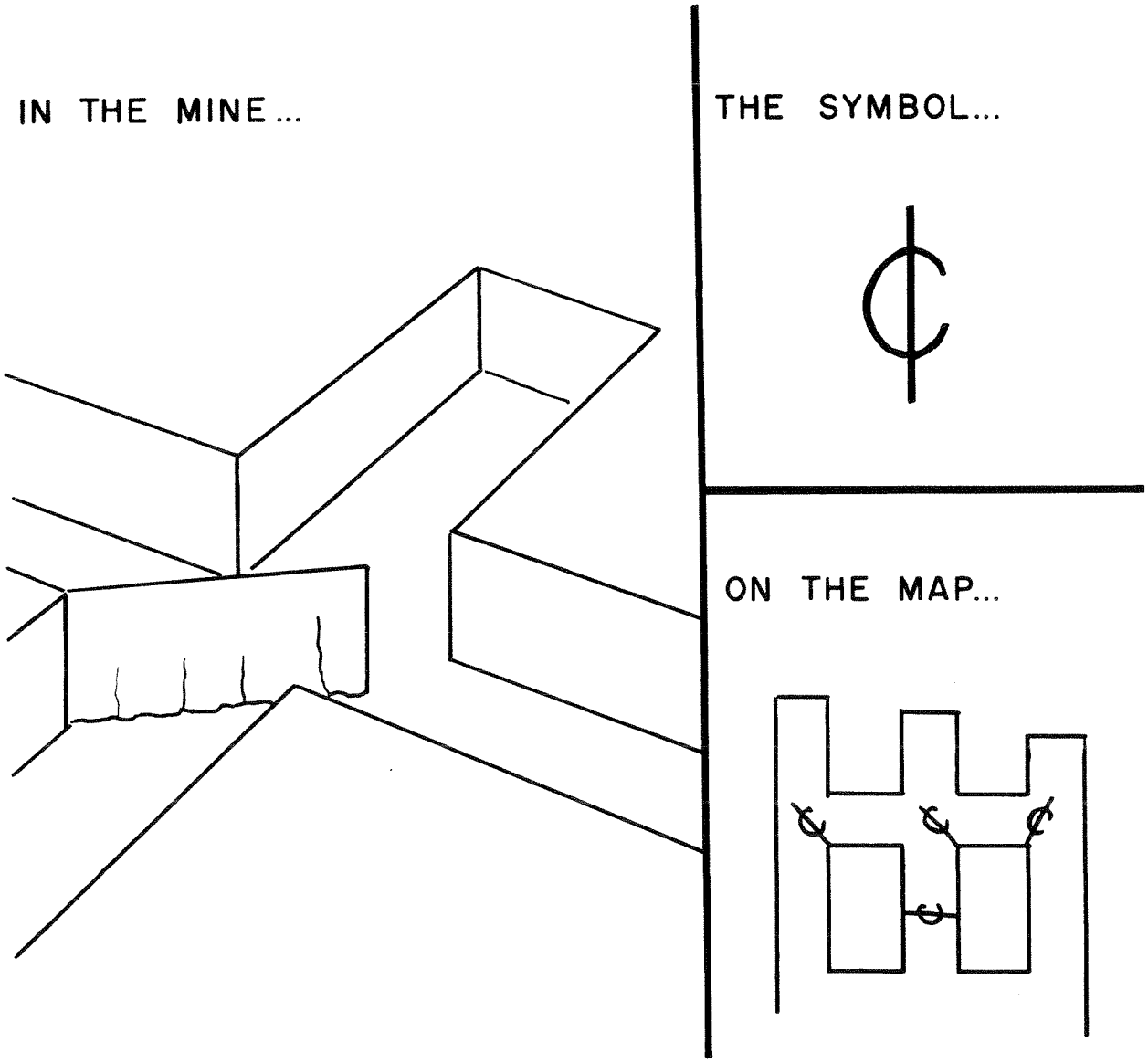
The exhaust method supplies air to the face by sending it through the large division of the entry first and returning it through the narrow opening between the rib and the brattice.

1. Advantages of the exhaust method.
a. It carries the dust away from the operator.
b. It eliminates passing through a check curtain on the way to the loading point.
c. It carries methane gas liberated at the face directly into the return.
2. Disadvantages of the exhaust method.
a. It does not dilute high concentrations of methane.
b. It's more difficult to maintain the installed ventiilation system.
c. Rigid support of the line brattice is needed to counteract the ventilation pressure.

* See page 38.
** See page 39.

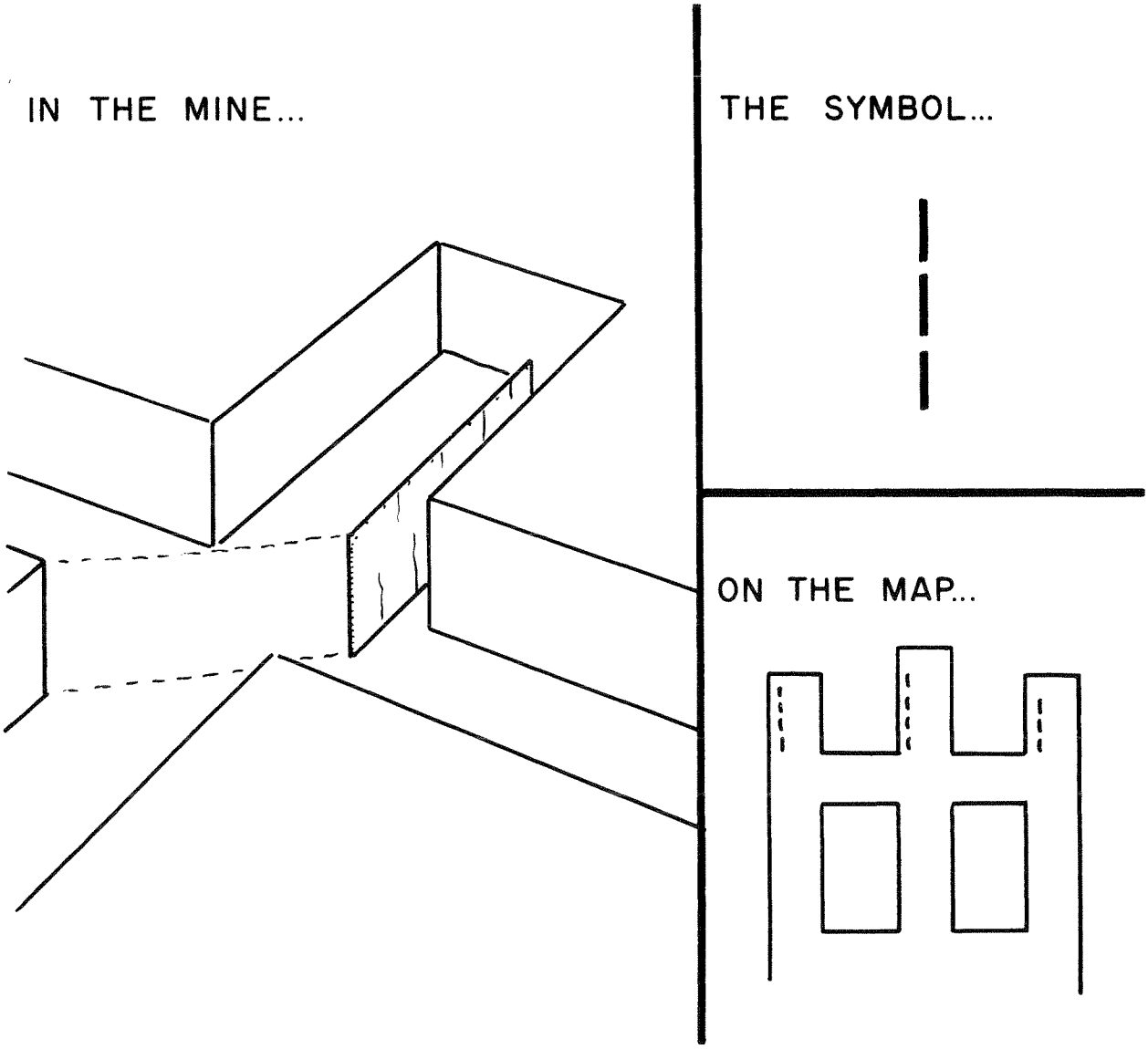
Check Curtains

Check curtains (sometimes called flys) are a lot like temporary stoppings in that they direct the air current and they are made of any incombustible fabric such as canvas or a special type of plastic. The difference is that check curtains are built in such a way that miners and machines can go through them easily. They are usually slit up the middle and they are not fastened at the bottom. They are used to deflect the air current from an entry or crosscut into a working place.



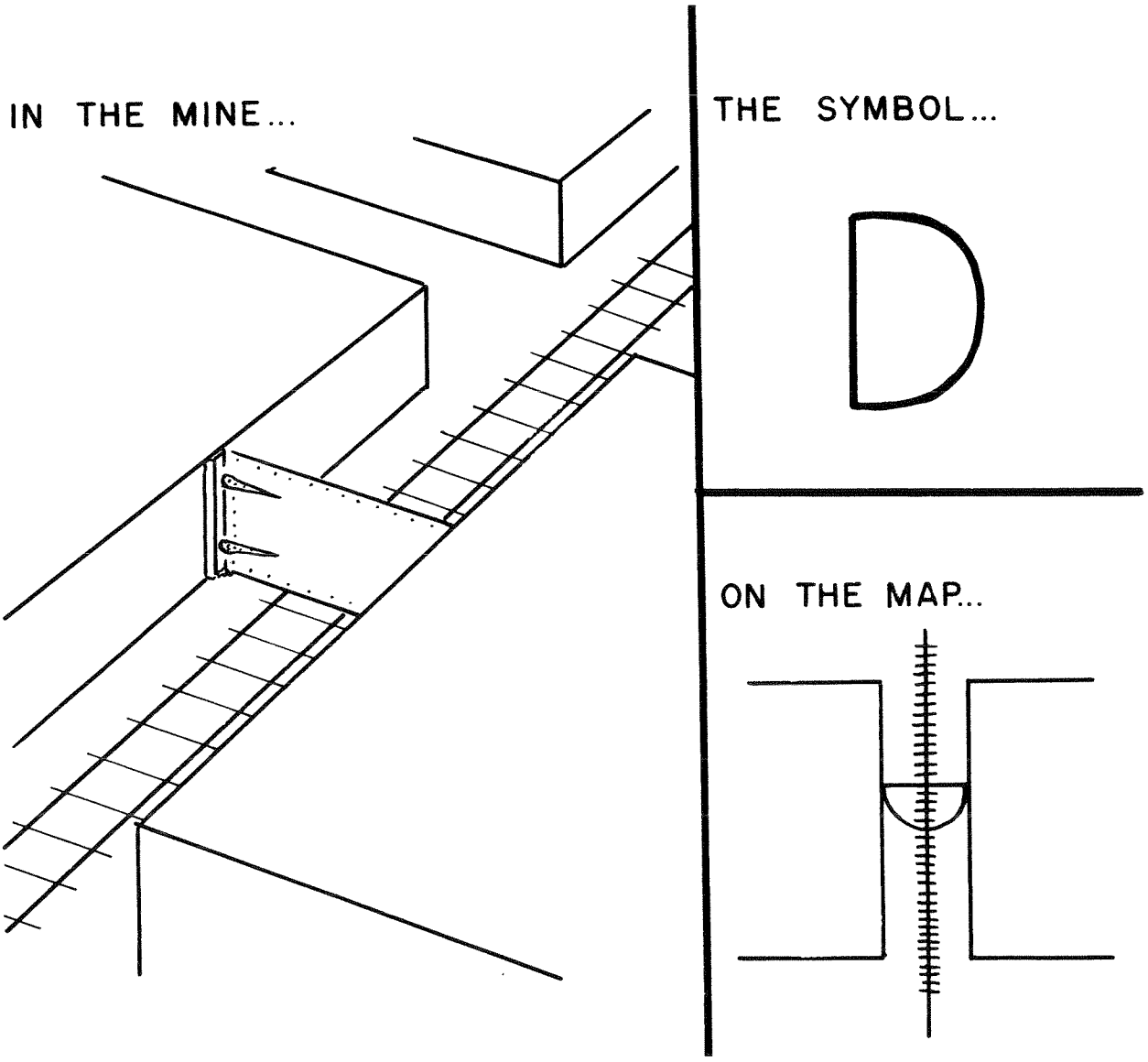
Line Brattice

Line brattice is a curtain made of cloth or plastic (material must be incombustible) hung from the roof to the floor and extending from the end of a check curtain to within ten feet of the working face. It can be hung from a rough lumber frame, from timber posts, from the roof bolts or from special fasteners. Line brattice is used to channel enough air to or from the working face to remove dangerous gases, smoke, and coal dust. It is extended as the mining progresses to keep the air flowing over the machines and the operator.



Mine Doors

Mine doors are large hinged doors that completely close off a mine passage. These doors are usually made of plywood and are always hung so that the ventilating air pressure will push them closed if they are left open. Some doors are manually operated and some are automatically operated. They are used to direct the air current away from the main haulage entry and at the same time allow haulage equipment to pass through. Doors are usually hung in pairs to form an air lock which prevents unnecessary air loss since one door is closed while the other is opened.



Study Questions

1. In each of the following pairs, put a check mark in front of the section which has the higher resistance.

A. _____ A section with small entries.

B. _____ A section with large entries.

C. _____ A long section.

D. _____ A short section.

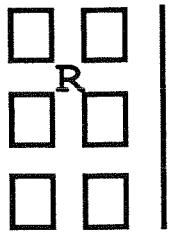
E. _____ A section with smooth roof and rib.

F. _____ A section with rough roof and rib.

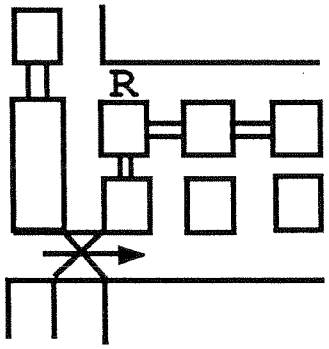
2. Draw the mine map symbol for a regulator. _____

3. Circle the letter of the map section that has the regulator properly located.

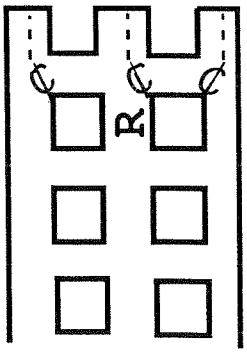
A.



B.



C.



4. The symbol for a check curtain is _____.

5. Match:
   A. line brattice
   B. mine door
   C. check curtain

_____1. made of plywood; hinged; allows passage of equipment

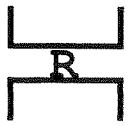
_____2. made of canvas or plastic; not fastened at the bottom; built to let men and machines through

_____3. made of cloth or some other fabric; used to channel air up to the working face

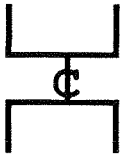
(Answers on the following page.)

Answers

1. A,C, and F.

2. 

3. B.

4. 

5. B-1,C-2, A-3.